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a certain current. No such current is produced, and I conceive, with the admission above, that such a result proves that the contacts *iron-zinc* and *platinum-zinc* are entirely without electromotive force.

822. Gold, silver, potassium, and copper were introduced at x with the like negative effect; and so no doubt might every other metal, even according to the relation admitted amongst the metals by the supporters of the contact theory (797). The same negative result followed upon the introduction of many other conducting bodies at the same place; as, for instance, those already mentioned as easily conducting the thermo current (808); and the effect proves, I think, that the contact of any of these with either iron or platinum is utterly ineffective as a source of electromotive force.

823. The only answer which, as it appears to me, the contact theory can set up in opposition to the foregoing facts and conclusions is to say that the solution of sulphuret of potassium in the cup D, fig. 65, acts as a metal would do (797), and so the effects of all the contacts in the circuit are exactly balanced. I will not stop at this moment to show that the departure with respect to electrolytes, or the fluid bodies in the voltaic pile, from the law which is supposed to hold good with the metals and solid conductors, though only an assumption, is still essential to the contact theory of the voltaic pile (798, 849);¹ nor to prove that the electrolyte is no otherwise like the metals than in having no contact electromotive force whatever. But believing that this will be very evident shortly, I will go on with the experimental results, and resume these points hereafter (847; 877).

824. The experiment was now repeated with the substitution of a bar of *nickel* for that of iron, fig. 65 (812), all other things remaining the same.² The circuit was again found to be a good conductor of a feeble thermo current, but utterly inefficient as a voltaic circuit when all was at the same temperature, and due precautions taken (1039). The introduction of metals at the

¹ See Fechner's words.—Philosophical Magazine, 1838, xiii. 377.

² There is another form of this experiment which I sometimes adopted, in which the cup E, fig. 65, with its contents, was dismissed, and the

platinum plates in it connected together. The arrangement may then be considered as presenting three contacts of iron and platinum, two acting in one direction, and one in the other. The arrangement and the results are virtually the same as those already given. A still simpler but equally conclusive arrangement for many of the arguments, is to dismiss the iron between a and b altogether, and so have but one contact, that at x , to consider.